



# TRAFFIC SIGNAL JUMPING DETECTION AND REAL-TIME TRAFFIC DATA ANALYSIS USING RFID

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## ABSTRACT

In this system, named "Detection of signal jumping using (RFID) tag" is used as a superior alternative to the manual fine collection method employed at traffic signals. In order to overcome the major issues of vehicle congestion and time consumption RFID technology is used. RFID reader fixed at Traffic signals that reads the tag attached to the windshield of a vehicle. When Red signal is glowing and any vehicle cross the signal line then the fine automatically generated and deducted from users account. In cities heavy vehicles are only allowed at the time of night, when any heavy vehicle enters in city at day time then fine is generated and deducted from driver account. The object detection sensor in the reader detects the approach of the incoming vehicle's tag and fine deduction takes place through e-wallet assigned to the concerned RFID tag that belongs to the owners' account

**KEYWORDS:** RFID (Radio Frequency Identification).

## INTRODUCTION:

Increase in population and urbanization in India are going hand in hand and as a result many smaller cities in India have become million cities. The increase in the number of million cities have created pressure on the exiting recourses in terms of infrastructure, traffic, roads, lights, housing etc. This has led to an alarming increase in the number of vehicles plying on roads on each of these million cities. It has brought congestion and huge traffic jams resulting in increasing the commuters' journey time and reduced speed. Because of increasing vehicles now a days it is very difficult for police department to manage Proposed system we are using RFID/NFC tag for tracking vehicles whose breaking signal, track heavy vehicles in city at day time, vehicles which are coming in wrong direction, detecting stolen vehicle. So the Traffic police department needs automation to control increasing number of vehicles and also Vehicle users should get punished instantly when they breaks the rules and regulations of traffic department. Currently traffic police are overloaded with duties, which leads to traffic jams and unnecessary accidents. Traffic-signal control systems coordinate individual traffic signals and with the help of NFC tag detecting vehicles whose breaking traffic rules and generate fine. These systems communications network to tie them together, and a central computer or network of computers to manage the system. Coordination can be implemented through a number of techniques including time-base and hardwired interconnection methods. The proposed system avoiding traffic congestion, minimizes traffic rates and track vehicle whose breaking rules.

## MATERIALS AND METHODS:

We have used many hardware and software materials such as RFID tag, RFID scanner, Arduino, Wifi module, computer and software as operating system- windows 7, programming language-java, database-mysql.

We used Haversine algorithm to calculate the distance of nearest police station. The haversine formula hav of  $\Theta$  is given by:

$$\text{hav}(\Theta) = \text{hav}(\varphi_2 - \varphi_1) + \cos(\varphi_1) \cos(\varphi_2) \text{hav}(\lambda_2 - \lambda_1)$$

Following steps involved in this process

We will develop hardware kit of project initially

We will test whether RFID tags are getting scanned by RFID readers

We will then write web app to transfer RFID data to server for further processing

We will then write business logic of our project which will cut fine from user breaking the rules

We will then test the system using manual testing and user acceptance testing

## RESULTS:

- Automatic fine collection from bank accounts.
- Completely legal cash flow without any bribes.
- Detection of vehicles violating traffic signals by means of RFID tags.

- The developed application is easy to use, economical and does not require any special training.
- This project simplifies the police work by automation.
- This project will stop generation of cash and will increase digital payments

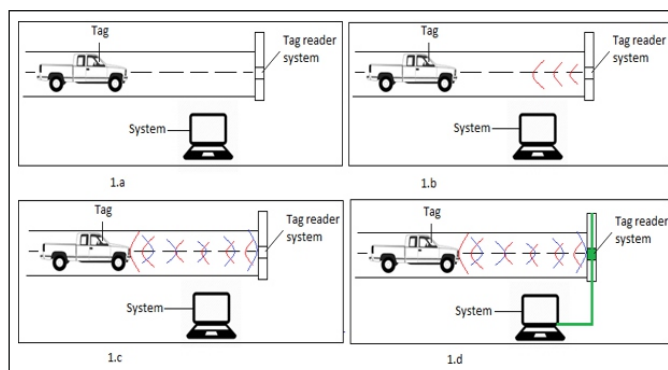
## DISCUSSION:

First of all, RFID tag will be fitted to vehicle which user is going to purchase. Every vehicle will have it's unique RFID tag number. The vehicle will be driven on the road. If the vehicle stops at the signal before the zebra lines when it is red, no problem, the rule is not violated. But if the vehicle crosses the zebra lines even if the signal is red, tag on the crossing lines will detect the RFID tag number applied to the vehicle. RFID tag on the crossing lines, through it's radio frequency waves will signal to the controller which is fitted inside the signal. Controller is a very low costing, small in size chip which will be fitted in the signal to detect the RFID signals sent by the tag on the crossing lines. Controller will send a request to the server to draw out the information which will be saved in database of it. After receiving the request from controller, server will work on controller's request.

After retrieving information of that particular vehicle, two responses by the server will be made:

- To the application (so that the data of this vehicle will be stored on the application)
- To the user who has violated the rule by jumping the signal.

The proposed system for traffic violation detection and traffic flow analysis comprises as reading information stored in RFID tag by RFID reader placed near road's traffic signals, extracting of information from RFID reader and traffic signal, and data analysis in server.



There are two sensorial inputs: RFID detections from passive RFID tags placed in vehicle and signal from active traffic signals. The information about the vehicle is read using RFID tag reader. The RFID tag attached to a vehicle contains a microchip which has unique tag number, vehicle number and owner's name,

address, phone number and email. The RFID reader which is a two way radio transmitter-receiver sends out electromagnetic signal to these tags. The tag antenna, which is tuned to receive these waves, responds by modulating the waves and sending it back to the reader which converts the response waves into digital data. A passive RFID tag is used as it draws power from field created by the reader and uses it to power the microchip's circuits. Moreover RFID reader has ability to read more than one tag response at the same time, thereby improving the overall performance of the process. The status of the traffic signal is acquired from the traffic light controller.

#### CONCLUSION:

The developed application is easy to use, economical and does not require any special training. System simplifies the police work by automation. This system will stop generation of cash and will increase digital payments.

#### REFERENCES:

1. Traffic Congestion in Bangalore-A Rising Concern. [Online]. Available: <http://www.Commonfloor.com/guide/traffic-congestion-in-Bangalorearising-concern-27238.html>, accessed 2013.
2. Shruthi K R and Vinodha K, "Priority Based Traffic Lights Controller Using Wireless Sensor Networks", International Journal of Electronics Signals and Systems (IJESS)
3. Ms. Pallavi Choudekar, Ms. Sayanti Banarjee and Prof. M K Muju, "Real Time Traffic Light Control Using Image Processing", Pallavi Choudekar et. al./ Indian Journal of Computer Science and Engineering (IJCSE), ISSN: 0976- 5166, Vol. 2 No. 1.
4. R. Hegde, R. R. Sali, and M. S. Indira, "RFID and GPS Based Automatic Lane Clearance System For Ambulance", Int. J. Adv. Elect. Electron.Eng, vol.2, no. 3, pp. 102-107, 2013.
5. "Smart traffic light control using fuzzy logic and wireless sensor network", Roxanne Hawi; George Okeyo; Michael Kimwele, 2017 Computing Conference, Year: 2017, Pages: 450-460.
6. "A comparative study on traffic violation level prediction using different models", Jieliang Jin; Yuanchang Deng, 2017 4th International Conference on Transportation Information and Safety (ICTIS), Year: 2017, Pages: 1134-1139